

### **Abstract of the Disclosure**

- 5 A method and apparatus for efficient filter structure for an enhanced operation of an ADSL-DMT modem on a subscriber loop with an environment consisting of ISDN interference. The method performs equalization of the channel by impulse response shortening and at the same time rejecting interference signals exhibiting cyclostationary properties. The method and apparatus for reducing the crosstalk involves a frequency-  
10 shifted versions of the received signal being filtered through frequency-shifted adaptive filters in the appropriate branches, and providing a joint time domain equalizer/crosstalk canceller to perform equalization of the channel and crosstalk cancellation in one instance and a separate crosstalk canceller to cancel crosstalk plus a time domain equalizer to equalize the channel. Downsampling the signal outputs of both the combined crosstalk  
15 equalizer and the frequency-shifted adaptive filters to reduce sampling rate; and subtracting the outputs of the combined crosstalk equalizer and the frequency-shifted adaptive filters to remove the cyclostationary interferer.